

# Three new species of subgenus *Planempis* (Diptera: Empididae) from Sichuan, China

Jingyu WANG, Yue LIU, Ding YANG<sup>①</sup>

Department of Entomology, College of Plant Protection, China Agricultural University, Beijing 100193, China

**Abstract:** The subgenus *Planempis* Frey, 1953 is a moderately large group in the genus *Empis* Linnaeus. It is distributed only in the Palaearctic and Oriental Regions with 46 known species. Eight species were known to occur in China. Here the subgenus *Planempis* is recorded from Sichuan for the first time. Three new species are described as follows: *Empis* (*Planempis*) *flavipedalis* **sp. nov.**, *Empis* (*Planempis*) *nigripedalis* **sp. nov.**, and *Empis* (*Planempis*) *yajiangana* **sp. nov.** A key to species of *Planempis* from Sichuan is presented.

**Key words:** Empidoidea; taxonomy; dance flies; key

中国四川平舞虻亚属 *Planempis* 三新种 (双翅目: 舞虻科)

王婧瑜, 刘悦, 杨定<sup>①</sup>

中国农业大学植物保护学院昆虫学系, 北京 100193

**摘要:** 平舞虻亚属 *Planempis* Frey, 1953 为舞虻属 *Empis* 一个中等大小的类群, 全世界已知 46 种, 仅局限分布于古北区和东洋区, 我国已知 8 种。本文发现平舞虻亚属 *Planempis* 在我国四川有分布, 记述如下 3 新种: 黄足平舞虻 *Empis* (*Planempis*) *flavipedalis* **sp. nov.**, 黑足平舞虻 *Empis* (*Planempis*) *nigripedalis* **sp. nov.** 和雅江平舞虻 *Empis* (*Planempis*) *yajiangana* **sp. nov.**, 并编制了分种检索表。

**关键词:** 舞虻总科; 分类; 舞虻; 检索表

## Introduction

*Planempis* Frey, 1953 is a moderately large subgenus of the genus *Empis* Linnaeus with 46 known species, which are distributed in the Palaearctic and Oriental Regions (Yang *et al.* 2007; Wang *et al.* 2010; Shamshev 2020). This subgenus is characterized by male cercus much enlarged often with a flattened dorsal surface, bifurcated into long dorsal and short ventral arms and apically extended beyond the epandrium (Wang *et al.* 2010; Shamshev 2020). Shamshev (2002) described or redescribed six species and proposed a key to all known species except *E. frauscheri* Strobl from Austria and Romania. Shamshev (2020) compiled a key to 16 species of *Planempis* known from the Oriental Region. The major references dealing with species of *Planempis* are as follows: Collin (1941), Frey (1953, 1954, 1955), Saigusa (1964, 1992, 2012), Daugeron & Chvála (2002), Shamshev (2002, 2020), Shamshev & Daugeron (2018) and Wang *et al.* (2010). Eight species of *Planempis* were known to occur in China (Yang *et al.* 2007, 2018). In the present paper, *Planempis* is newly recorded from Sichuan with descriptions of three new species. A key to the species of *Planempis* from Sichuan is provided.

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① Corresponding author, E-mail: dyangcau@126.com

## Material and methods

The specimens were examined and illustrated using a ZEISS Stemi 2000–c. Genitalic preparations were made by macerating the apical portion of the abdomen in cold 10% NaOH for about 6 hours. The type specimens are deposited in the Entomological Museum of China Agricultural University (CAU), Beijing. The following abbreviations are used: acr — acrostichal bristle(s); ad — anterodorsal bristle(s); av — anteroventral bristle(s); dc — dorsocentral bristle(s); h — humeral bristle(s); ih — inner humeral bristle(s); ph — posterior humeral bristle(s); npl — notopleural bristle(s); oc — ocellar bristle(s); pd — posterodorsal bristle(s); presc — prescutellar bristle(s); psa — postalar bristle(s); pv — posteroventral bristle(s); sa — supra-alar bristle(s); sc — scutellar bristle(s).

### Key to species (males) of the subgenus *Planempis* from Sichuan

1. Eyes very narrowly separated on frons, frons narrower than median ocellus; 4 sc; first flagellomere rather long, 4.1–4.6 times longer than wide ..... 2
- . Eyes distinctly separated on frons, frons distinctly wider than median ocellus; 6 sc; first flagellomere somewhat short, 2.8 times longer than wide ..... *E. (P.) yajiangana* **sp. nov.**
2. Legs mostly brownish yellow; male cercus with an U-shaped apical incision, ventral process of dorsal arm apically obtuse and directed downward ..... *E. (P.) flavipedalis* **sp. nov.**
- . Legs mostly black; male cercus with a V-shaped apical incision, ventral process of dorsal arm apically acute and strongly bent backward ..... *E. (P.) nigripedalis* **sp. nov.**

#### 1. *Empis (Planempis) flavipedalis* **sp. nov.** (Fig. 1)

Description. Male. Body length 6.6–6.9 mm; wing length 6.2–6.6 mm.

Head black with pale gray pollen. Eyes very narrowly separated on frons, dark brownish yellow not enlarged; frons linear, narrower than median ocellus. Hairs and bristles on head black; hairs bristle-like, but those on ventral surface of occiput thin, dark yellow; ocellar tubercle distinct, with 2 long oc and 4 short posterior hairs. Antenna black; first flagellomere 4.6 times longer than wide, stylus 0.35 times as long as first flagellomere. Proboscis very long, 2.3 times longer than head height, brownish to dark brown with short black hairs; palpus dark yellow with brownish yellow or black hairs.

Thorax black with pale gray pollen; mesoscutum with three dark brown longitudinal stripes. Hairs and bristles on thorax black; hairs on mesonotum short and sparse; 1 h, 1 ih, 1 ph, 3 long npl, irregularly biseriate acr short hair-like (two rows separated); irregularly biseriate dc short hair-like, 1 presc, 1 sa, 1 psa; scutellum with 4 sc. Laterotergite with group of long dense dark yellow hairs. Prosternum with some dark yellow dorsal hairs laterally. Legs brownish yellow except fore coxa tinged blackish at extreme base, mid and hind coxae tinged black basally or mostly; knees black; tarsi blackish except tarsomere 1 dark brownish yellow with blackish apex. Hairs and bristles on legs black except those on coxae partly or mostly dark yellow. All femora subequal in thickness. Fore tibia with 3 ad and 2 pv; apically with 3 bristles. Mid tibia with 2–3 ad, 1 pd and 1 pv; apically with 4 bristles. Hind tibia slightly thickened, nearly as thick as hind femur; hind tarsomere 1 slightly thickened, narrower than hind tibia. Hind tibia with 5 ad, 4 pd and 3 pv; apically with 3 bristles. Fore tarsomere 1 with 1 ad at middle, 5 av and 3 pv; apically with 6 bristles. Mid tarsomere 1 with 4–5 av and 3–4 pv; apically with 5 bristles. Hind tarsomere 1 with 2 ad, 3 pd, 4 av and 2 pv; apically with 5 bristles. Wing hyaline; dark brown stigma long, narrow; veins dark brown;  $M_1$  and  $M_2$

reaching wing margin. Squama dark brownish yellow, bordered with dark yellow hairs. Halter dark yellow with brown base.

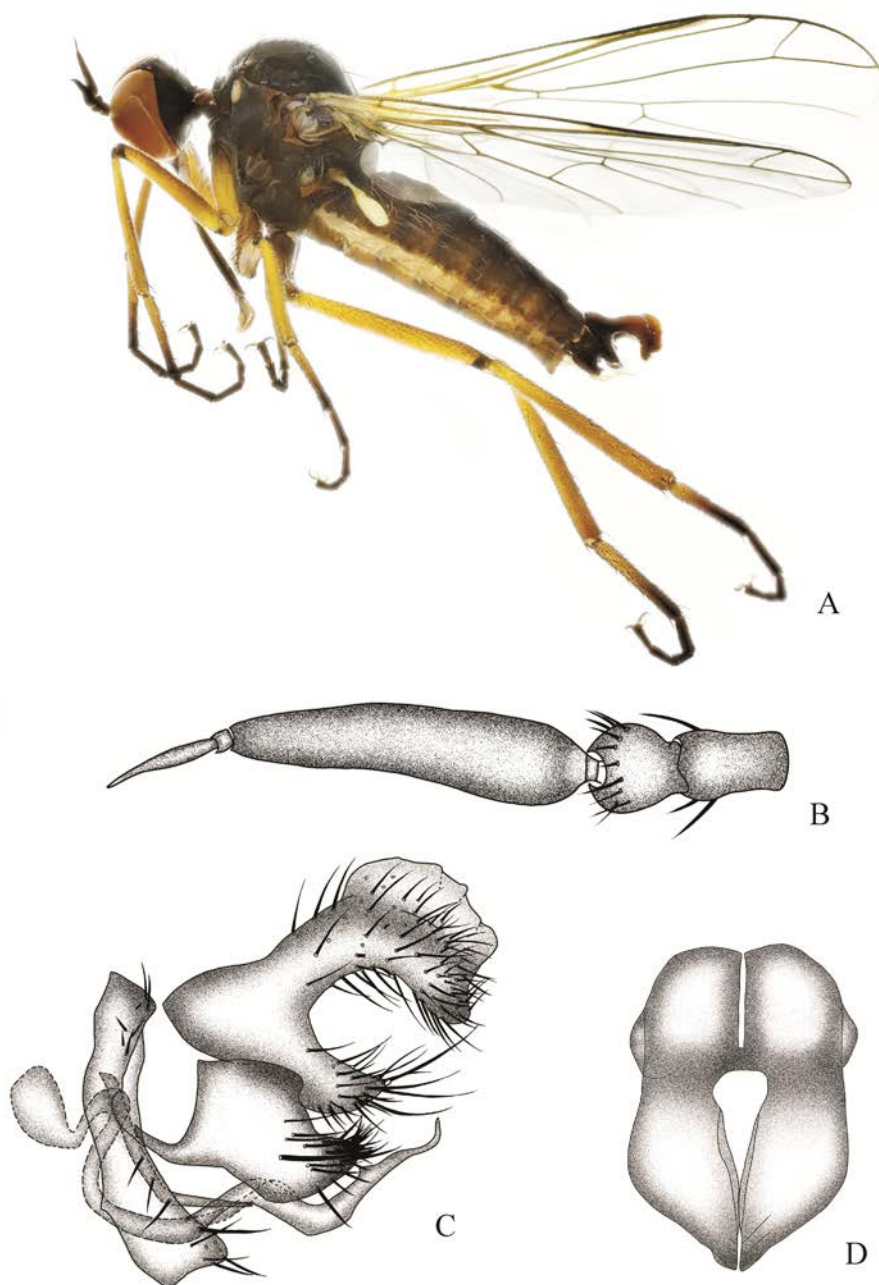


Figure 1. *Empis (Planempis) flavipedalis* **sp. nov.** A. ♂, lateral view; B. Antenna, lateral view; C. Male genitalia, lateral view; D. Cercus, dorsal view.

Abdomen nearly straight, apically weakly curved downward, black with pale gray pollen;

hypopygium weakly swollen, slightly narrower than pregenital segments. Hairs and bristles dark yellow, tergites 1–7 with short black hairs at middle, sternite 8 with black hairs and bristles. Hairs and bristles on hypopygium blackish.

Male genitalia (Figs 1C, 1D). Epandrial lobe slightly longer than wide, somewhat quadrate, apically with short obtuse ventral process bearing short dense hairs. Cercus rather large and broad, dorsally weakly concaved, strongly projected beyond epandrial lobe; dorsal arm with distinct posterior ridge and ventral process apically obtuse and directed downward, ventral arm with narrowed tip distinctly bent backward.

Female. Unknown.

**Holotype.** ♂, China, Sichuan, Yajiang, Gexigou, 2917 m, 28-VI-2020, Liang WANG (CAU). **Paratypes.** 6♂, same data as holotype (CAU).

Etymology. The specific epithet refers to the mostly brownish yellow legs.

Diagnosis. Male eyes very narrowly separated on frons, frons linear. Mesoscutum with three dark brown longitudinal stripes. 4 sc. Legs mostly brownish yellow. Male cercus with a U-shaped apical incision, ventral process of dorsal arm apically obtuse and directed downward.

The new species is somewhat similar to *E. (P.) tianmushana* Liu, Saigusa & Yang from Zhejiang of China, but can be easily separated from the latter by the following features: eyes very narrowly separated on frons; hind tibia entirely brownish yellow; male cercus rather long, apically distinctly extended beyond epandrial lobe. In *E. (P.) tianmushana*, the eyes are contiguous on the frons, the hind tibia is blackish at tip, and male cercus is short, apically slightly extended beyond the epandrial lobe (Liu, Saigusa & Yang 2012).

## 2. *Empis (Planempis) nigripedalis* sp. nov. (Fig. 2)

Description. Male. Body length 6.7–7.1 mm; wing length 6.2–6.5 mm.

Head black with pale gray pollen. Eyes very narrowly separated on frons, brownish yellow; frons linear. Hairs and bristles on head black; hairs bristle-like, but those on ventral surface of occiput thin, dark yellow; ocellar tubercle distinct, with 2 long oc and 4 short posterior hairs. Antenna black; first flagellomere 4.1 times longer than wide, stylus 0.4 times as long as first flagellomere. Proboscis very long, 2.3 times longer than head height, brownish to dark brown with short black hairs; palpus dark yellow with brownish yellow or black hairs.

Thorax black with pale gray pollen; mesoscutum with three dark brown longitudinal stripes. Hairs and bristles on thorax black; hairs on mesonotum short and sparse; 1 h, 1 ih, 1 ph, 3 long npl, irregularly biseriate acr short hair-like (two rows separated); irregularly biseriate dc short hair-like, 1 presc, 1 sa, 1 psa; scutellum with two pairs of sc. Laterotergite with group of long dense dark yellow hairs. Prosternum with some dark yellow dorsal hairs laterally. Legs black except extreme tip of fore coxa, extreme bases and tips of all femora, and narrow bases of all tibiae dark brownish yellow. Hairs and bristles on legs black except those on coxae partly or mostly dark yellow. All femora subequal in thickness. Fore tibia with 3 ad, 2 pd and 1 pv; apically with 3 bristles. Mid tibia with 2 ad, 5 pd and 3 pv; apically with 4 bristles. Hind tibia slightly thickened, nearly as thick as hind femur; hind tarsomere 1 slightly thickened, narrower than hind tibia. Hind tibia with 4 ad and 6 pd; apically with 3 bristles. Fore tarsomere 1 with 5 av and 3 pv; apically with 6 bristles. Mid tarsomere 1 with 4 av; apically with 5 bristles. Hind tarsomere 1 with 2 ad, 3 pd and 4 thick av; apically with 5 bristles. Wing hyaline;

dark brown stigma long, narrow; veins dark brown;  $M_1$  and  $M_2$  reaching wing margin. Squama dark brownish yellow, bordered with dark yellow hairs. Halter yellow with brown base.

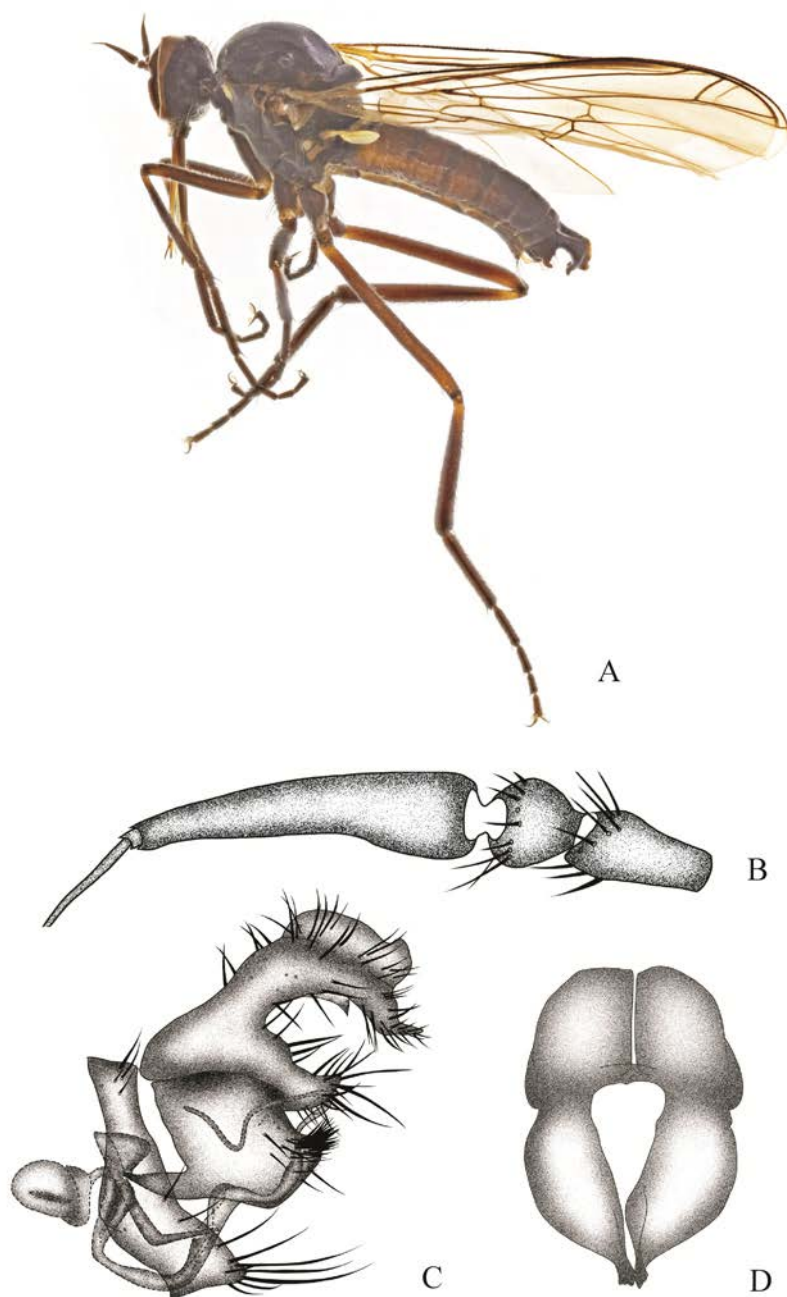


Figure 2. *Empis (Planempis) nigripedalis* sp. nov. A. ♂, lateral view; B. Antenna, lateral view; C. Male genitalia, lateral view; D. Cercus, dorsal view.

Abdomen nearly straight, apically weakly or distinctly curved downward, black with pale gray pollen; hypopygium swollen, slightly narrower than pregenital segments. Hairs and

bristles dark yellow, tergites 1–7 with short black hairs at middle, sternite 7 with few black posterior hairs at middle, sternite 8 with black hairs and bristles. Hairs and bristles on hypopygium blackish to black.

Male genitalia (Figs 2C, 2D). Epandrial lobe slightly longer than wide, somewhat quadrate, apically with weak ventral process bearing short dense hairs. Cercus rather large and broad, dorsally weakly concaved, apically strongly projected beyond epandrial lobe; dorsal arm with distinct posterior ridge and ventral process apically acute and strongly bent backward.

Female. Body length 5.9–6.1 mm; wing length 5.9–6.1 mm. All tibiae brownish yellow, narrow bases of all tarsomere 1 dark brownish yellow. Mid and hind femora with plumose dorsal and ventral hairs. Hind tibia with plumose dorsal and ventral hairs at basal 2/3.

**Holotype.** ♂, **China**, Sichuan, Batang, Zhubalong, 3841 m, 03-VII-2020, Liang WANG (CAU). **Paratypes.** 3♂1♀, same data as holotype (CAU); 29♂1♀, Sichuan, Batang, Zhubalong, 2700 m, 02-VII-2020, Liang WANG (CAU); 1♂, Sichuan, Derong, Gajinxueshan, 3380 m, 06-VII-2020, Liang WANG (CAU).

Etymology. The specific epithet refers to the mostly black legs.

Diagnosis. Eyes very narrowly separated on frons, frons linear. Mesoscutum with three dark brown longitudinal stripes. 4 sc. Legs mostly black, but partly dark brownish yellow. Male cercus with a V-shaped apical incision, ventral process of dorsal arm apically acute and strongly bent backward.

This new species is very similar to *E. (P.) flavipedalis* **sp. nov.**, but can be easily separated from the latter by the legs mostly black, male cercus with a V-shaped apical incision and ventral process of dorsal arm apically acute and strongly bent backward.

### 3. *Empis (Planempis) yajiangana* **sp. nov.** (Fig. 3)

Description. Male. Body length 5.6 mm; wing length 6.6 mm.

Head black with pale gray pollen. Eyes distinctly separated on frons, brownish yellow; frons distinctly wider than median ocellus. Hairs and bristles on head black; hairs bristle-like, but those on ventral surface of occiput thin, dark yellow; ocellar tubercle distinct, with 2 long oc and 4 short posterior hairs. Antenna black except pedicel dark brownish yellow; first flagellomere 2.8 times longer than wide, stylus 0.5 times as long as first flagellomere. Proboscis somewhat short, 1.5 times longer than head height, brownish to dark brown with short black hairs; palpus dark yellow with brownish yellow or blackish hairs.

Thorax black with pale gray pollen; mesoscutum with one dark brown mid-longitudinal stripe. Hairs and bristles on thorax black; hairs on mesonotum somewhat long, antero-lateral area including humeri with long and somewhat dense hairs, 2 long npl, irregularly biseriate acr short hair-like (two rows narrowly separated); irregularly triseriate dc short hair-like, 1 presc, 1 sa, 1 psa; scutellum with 6 sc. Laterotergite with group of long dense black hairs. Prosternum with some dark yellow dorsal hairs laterally. Legs yellow except fore and mid coxae tinged blackish at extreme base, hind coxa tinged black at base; all knees blackish; fore tibia brownish yellow; all tarsi blackish. Hairs and bristles on legs black except those on fore coxa entirely dark yellow and those on mid and hind coxae partly dark yellow. Fore femur as thick as mid femur, hind femur 1.2 times as thick as mid femur. Hind femur with about three irregular and close rows of plumose antero-dorsal hairs. Mid and hind femora with dense

ventral hairs and bristles (pv partly rather long), hind femur also with 5–6 long av on apical half. Fore tibia with 3 short thin ad; apically with 3 bristles. Mid tibia with 3 short thin ad and 4 short thin pd; apically with 4 bristles. Hind tibia with 2 short thin pd; apically with 3 bristles. Fore tarsomere 1 with 5 short thick pv; apically with 4 bristles. Wing hyaline, slightly tinged grayish; brown stigma long, narrow; veins dark brown;  $M_1$  and  $M_2$  reaching wing margin. Squama dark brownish yellow, bordered with dark yellow hairs. Halter dark yellow with brown base.

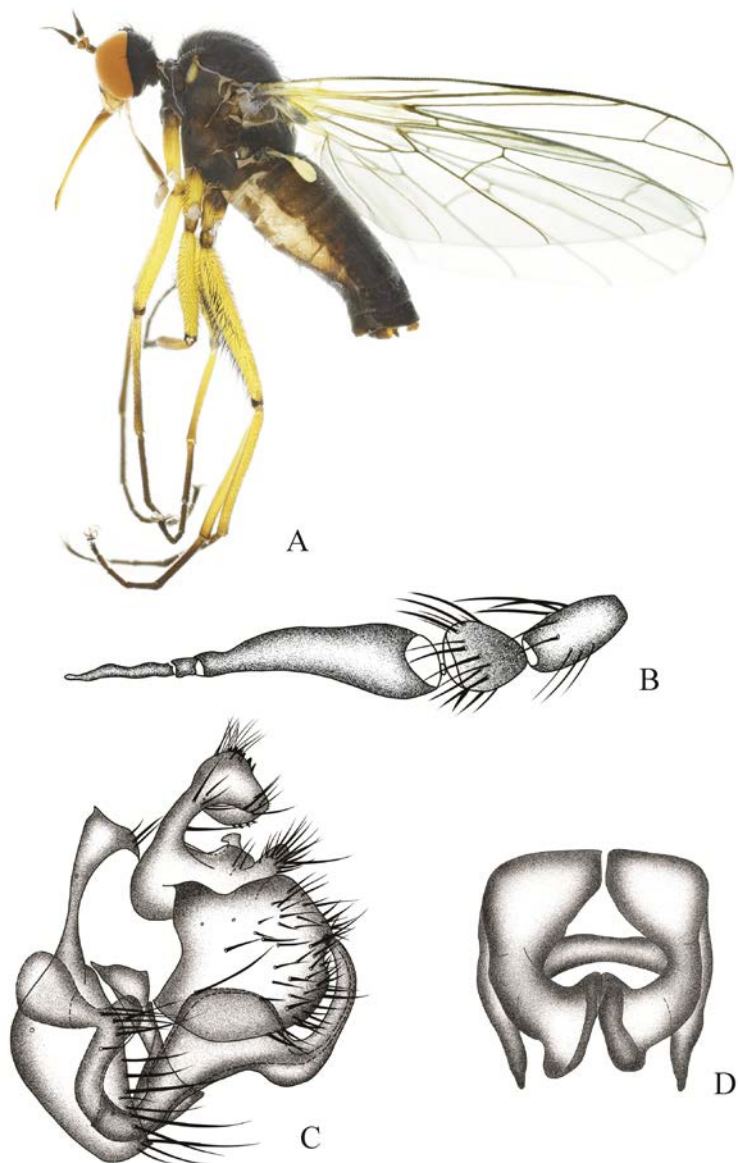


Figure 3. *Empis* (*Planempis*) *yajiangana* **sp. nov.** A. ♂, lateral view; B. Antenna, lateral view; C. Male genitalia, lateral view; D. Cercus, dorsal view.

Abdomen somewhat short and thick, nearly straight, blackish with pale gray pollen; hypopygium weakly swollen, slightly narrower than pregenital segments. Hairs and bristles black.

Male genitalia (Figs 3C, 3D). Epandrial lobe nearly as long as wide, somewhat quadrate. Cercus somewhat large and broad, dorsally flattened, apically not projected beyond epandrial lobe; dorsal arm apically with short ventral process, ventral arm basally wide but apically short, finger-like.

Female. Unknown.

**Holotype.** ♂, **China**, Sichuan, Yajiang, Xiangkezhong, 3575 m, 27-VI-2020, light trap, Liang WANG (CAU).

Etymology. The specific epithet refers to the type locality Yajiang.

Diagnosis. Eyes distinctly separated on frons, frons distinctly wider than median ocellus. First flagellomere 2.8 times longer than wide, stylus 1/2 as long as first flagellomere. 6 sc. Mesoscutum with one dark brown mid-longitudinal stripe. Legs mostly yellow.

This new species is similar to *E. (P.) freyi* Yang, Zhang & Zhang from Fujian, but can be easily separated from the latter by the head and thorax entirely black. In *E. (P.) freyi*, the head is partly yellow, and the thorax is reddish yellow with 5 dark vittae on the mesoscutum (Liu *et al.* 2012; Shamshev 2020).

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